

Clearly, foraging bees can lead to a rapid spread of the pathogen from tree to tree and may be responsible for the rapid dispersal of the disease in the Perth Metropolitan area. Sheridan *et al.* (1975) suggest that in New Zealand, sheep grazing under poplars and birds could be significant in dispersal of uredospores. The dispersal by bees appears to be more probable and should be investigated elsewhere.

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REFERENCES

- ANON. 1974/5. Annual Report Plant Research Division, Department of Agriculture, Western Australia.
- BAILEY, L. 1963. *Infectious Diseases of the Honey-bee*. Land Books, London.
- SHERIDAN, J. E., J. E. HARPER and G. STEVENSON. 1975. Note on Epidemiology and Control of Poplar Leaf Rust. *N.Z. J. Sci.*, 18: 211-16.
- VAN KRAAYENOORD, C. W. S., G. F. LAUNDON and A. G. SPIERS. 1974. Poplar Rusts Invade New Zealand. *Plant Dis. Rep.*, 58: 423-7.
- WALKER, J., D. HARTIGAN and A. L. BERTUS. 1974. Poplar Rusts in Australia, with Comments on Potential Conifer Rusts. *Eur. J. For. Pathol.*, 4: 100-18.

ROOT PARASITISM OF *HAKEA SULCATA* BY *NUYTSIA FLORIBUNDA*

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During a study of the effects of waterlogging on root growth of *Hakea sulcata* R.Br. (Proteaceae) (Lamont, 1976), a number of parasitic roots of *Nuytsia floribunda* (Labill.) R.Br. (Loranthaceae) were encountered. These haustoriogens (groups of haustoria forming rings around the host root) were first described in detail by Herbert (1919), and further studied by Grieve (1975) and Göbel (1975).

Resulting from this present study, Fig. 1A shows a rootlet of *N. floribunda* attached to a lateral of *H. sulcata* by a haustoriogen. The *H. sulcata* specimen was growing in a seasonally waterlogged depression in the Kenwick reserve of the Botany Department, University of Western Australia. A 2 m high specimen of *N. floribunda* was located within the swamp at a distance of about 4 m from the parasitized *H. sulcata*, and the next closest possible source was a 5 m specimen on a sandy rise about 13 m away.

Proteoid roots are dense clusters of rootlets found in most species of Proteaceae (Lamont, 1972a) and at least one legume (Lamont, 1972b). Fig. 1B is of particular interest for it shows portion of a proteoid root of *H. sulcata* parasitized by two haustoriogens. The two arms of the collar of the smaller haustoriogen have not yet merged. The fact that the *N. floribunda* roots have not parasitized the proteoid rootlets suggests either (a) that there is a minimum surface of contact requirement with a potential host before haustoriogen formation is initiated or (b) that the rootlets were not exuding the necessary chemical stimulant in sufficient quantities for initiation (Grieve, 1975) or (c) that the parent root was parasitized before the rootlets had emerged. Closer examination showed that the first two hypotheses deserve further study, as rootlets arising beneath the collar were not distorted or retarded in any way, but merely displaced laterally.

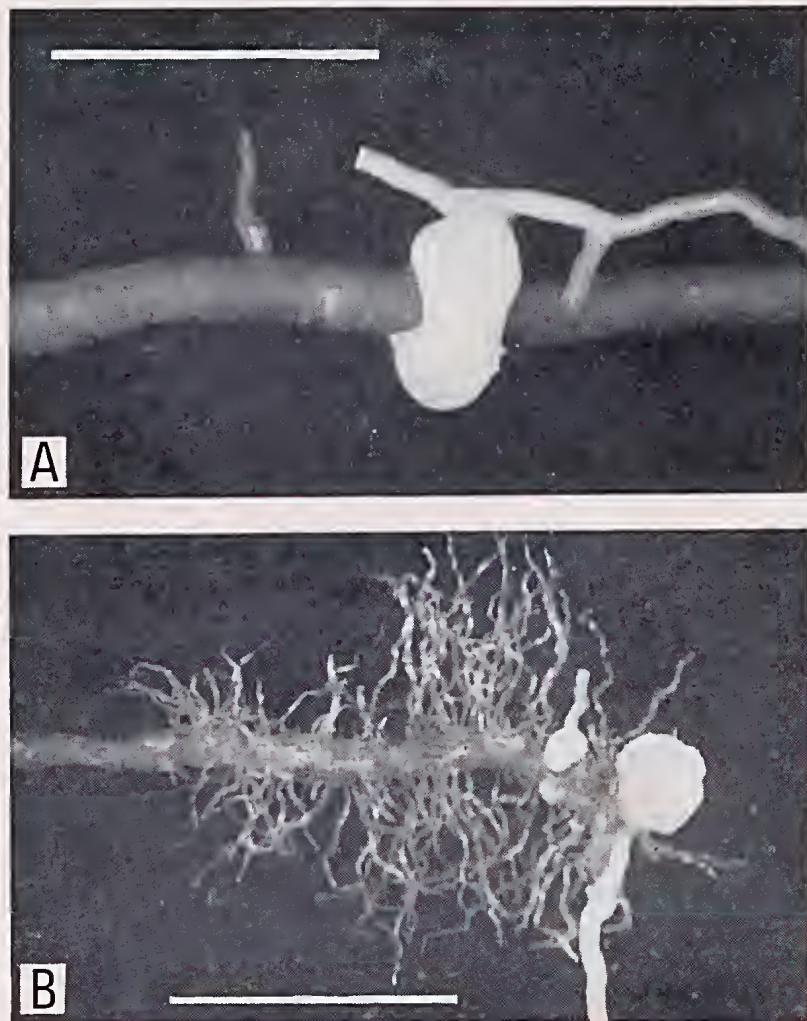


Fig. 1.—Haustoriogens of *Nuytsia floribunda* attached to (A) 'normal' and (B) proteoid roots of *Hakea sulcata*. Scales correspond to 5 mm.

REFERENCES

- GÖBEL, T. 1975. Some field observations on *Nuytsia floribunda* (Labill.) R.Br. *W.A. Nat.*, 29: 50-60.
- GRIEVE, B. J. 1975. Botany in Western Australia: a survey of progress: 1900-1971. *J. Roy. Soc. W.A.*, 58: 33-53.
- HERBERT, D. A. 1919. *Nuytsia floribunda* (the Christmas Tree). Its structure and function. *J. and Proc. Roy. Soc. W.A.*, 5: 72-88.
- LAMONT, B. 1972a. The morphology and anatomy of proteoid roots in the genus *Hakea*. *Aust. J. Bot.*, 20: 155-74.
- LAMONT, B. 1972b. 'Proteoid' roots in the legume *Viminaria juncea*. *Search*, 3: 90-1.
- LAMONT, B. 1976. The effects of seasonality and waterlogging on the root systems of a number of *Hakea* species. *Aust. J. Bot.*, 24: 691-702.